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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/485,464	02/04/2000	KENJI YAMAMURA	48531	1948

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EXAMINER

WESSMAN, ANDREW E

ART UNIT	PAPER NUMBER
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1742

12

DATE MAILED: 10/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/485,464

Applicant(s)

YAMAMURA ET AL.

Examiner

Andrew E Wessman

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-4 and 11 remain for examination, and have been amended.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 22, 2002 has been entered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. in view of Mitamura, and further in view of Murakami et al.

Matsumoto et al. discloses a bearing in which the bearing ring and/or a rolling element comprises a steel containing alloy ingredients of 0.2 to 1.23wt% C (table 1), 0.40wt% or less Si (table 1), 2.0wt% or less Mn (col. 5, line 44), 1wt% and 2wt% Cr (table 1) and 2wt% or less Mo (col. 5, line 36). Matsumoto et al. further discloses that the heat treatment of the steel includes carbonitriding, hardening and tempering (col. 5,

lines 3-4) and also discloses that the amount of retained austenite is less than 10 volume% (col. 4, lines 44-45). Matsumoto et al. also discloses a hardness of greater than 60 HRC.

Matsumoto et al. discloses that the retained austenite is less than 10vol%, but does not specifically give examples of 0 vol% retained austenite.

Matsumoto et al. discloses that the dimensional stability of the bearing is better when the average concentration of retained austenite is lower. Hence, there would be motivation to have 0% retained austenite so as to improve the dimensional stability. It is well known in the prior art, as evidenced in Matsumoto et al. (col. 4, lines 47-61) to have bearings with 0 vol% austenite for the purpose of producing bearings with high dimensional stability. It would have been obvious to one having ordinary skill in the art at the time the invention was made to find the optimum range of retained austenite, i.e. 0 vol%, since it has been held that where the general conditions of the claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, *In re Aller*, 105 USPQ 233, and the amount of retained austenite in the alloy is known to be a result effective variable for influencing the dimensional stability of bearings, as stated by Matsumoto et al. (col. 4, lines 47-61).

Applicant has contended that it would not have been obvious to have 0 vol% retained austenite in the alloy, and that the compositional limits present in table 1 of Matsumoto et al. do not show the claimed composition with sufficient specificity. Although the examiner still contends that Matsumoto et al. provides sufficient teachings

directed to those features, further teachings of additional references will now be presented.

With regards to the carbon content of the alloys, Mitamura teaches (col. 4, lines 45-65) that the carbon content is advantageously kept to between 0.8 and 1.2 wt% C in order to improve the endurance of the bearing and to perform the hardening at a reasonable temperature for processing and economic reasons.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a carbon content of between 0.8 and 1.2wt% carbon as taught by Mitamura in at least one of the bearing races and the rolling element taught by Matsumoto et al. in order to provide the bearing races or rolling elements with improved endurance and a lower hardening temperature, as taught by Mitamura.

With regards to the retained austenite being 0 vol%, Mitamura teaches (col. 3, lines 54-62) that it is advantageous to reduce the level of retained austenite in the alloy to 0 wt% (which is, of course, also 0 vol%) in every part of the bearing in order to provide the bearing with improved dimensional stability.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the amount of retained austenite to 0 vol% as taught by Mitamura in the bearing of Matsumoto et al. in order to provide the bearing with enhanced dimensional stability, as taught by Mitamura.

With regards to the chromium content, Murakami et al. teaches (col. 3, lines 23-32) that the chromium content is desirably between 0.5 and 3.0 wt%, and that such a chromium content is useful for precipitating carbide and nitride phases in the alloy, while

avoiding formation of an oxide film at the surface that can accompany too much chromium.

It would have been obvious to one of ordinary skill in the art to use 0.5 to 3.0wt% chromium as taught by Murakami et al. in the alloys of Matsumoto et al. in order to provide the alloys with carbide and nitride precipitates while avoiding the generation of an oxide film, as taught by Murakami et al.

Also of note with regard to the carbon and chromium content of the alloys of Matsumoto et al., the alloys of Mitamura (see table 1), Murakami et al. (col. 1, lines 12-14), and Matsumoto et al. (col. 4, line 68) are all directed to bearings made using the steel SUJ 2. Because the same steel is used for all the claimed steels, the alloys of Matsumoto et al. can have carbon and chromium contents of Mitamura and Murakami et al., despite not being specifically mentioned.

With regards to the amended features of the claims, wherein the hardness is specified to be on the raceway surface of the inner and outer rings and the rolling surface of the rolling element, Matsumoto et al. specifies (see abstract) that the surfaces of the raceway surface or the rolling contact surface has a hardness of at least 64 HRC. Because the raceway and rolling contact surfaces are the surfaces of interest in this discussion of bearings, it was assumed that the surface hardness was directed to the raceway and rolling surfaces, and so the scope of the claims is essentially unchanged.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. in view of Mitamura and further in view of Murakami et al. as applied to claims 1, 2, 4, and 11 above, and further in view of Tanaka et al.

Matsumoto et al. in view of Mitamura and further in view of Murakami et al. does not teach nitriding after hardening and tempering.

Tanaka et al. discloses (col. 12, lines 22-26 and lines 40-43) forming a nitride layer on a rolling member at least 2% or less of the diameter of the rolling member in the same field of endeavor for the purpose of preventing adhesion, decreasing friction, and significantly improving fretting damage. Tanaka et al. further discloses (col. 33, lines 40-44) that the nitride layer can be 20 microns, which is greater than 3 microns as claimed by applicant. Tanaka et al. further discloses a surface roughness of 0.27 microns. Actual overlap of all ingredients in the prior art is not required; mere contact (i.e. end-point touching) or CLOSE APPROXIMATION is sufficient to establish a prima facie case of obviousness; Titanium Metals Corp. v. Banner, (CAFC 1985) 778 F2d 775, 227 USPQ 575. Since Matsumoto et al. in view of Mitamura and further in view of Murakami et al. and further in view of Tanaka et al. discloses the composition of the alloy in which the components and ranges are a close approximation to those being claimed, the disclosure establishes a prima facie case of obviousness.

Response to Arguments

6. Applicant's arguments with respect to claims 1-4 and 11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew E Wessman whose telephone number is (703)305-3163. The examiner can normally be reached on Monday through Friday, 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (703)308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.


ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

AEW
September 30, 2002